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Energy to Serve Your World<sup>SM</sup>

July 13, 2005

Docket No.: 50-366

NL-05-1141

U. S. Nuclear Regulatory Commission  
ATTN: Document Control Desk  
Washington, D. C. 20555-0001

Edwin I. Hatch Nuclear Plant  
Licensee Event Report  
Manual Reactor Scram in Response to Reactor Water Chemistry Event

Ladies and Gentlemen:

In accordance with the requirements of 10 CFR 50.73(a)(2)(iv)(A), Southern Nuclear Operating Company is submitting the enclosed Licensee Event Report on a manual reactor scram that was inserted in response to a reactor water chemistry event caused by a condenser tube leak.

This letter contains no NRC commitments. If you have any questions, please advise.

Sincerely,

H. L. Sumner, Jr.

HLS/OCV/daj

Enclosure: LER 2-2005-003

cc: Southern Nuclear Operating Company  
Mr. J. T. Gasser, Executive Vice President  
Mr. G. R. Frederick, General Manager – Plant Hatch  
RTYPE: CHA02.004

U. S. Nuclear Regulatory Commission  
Dr. W. D. Travers, Regional Administrator  
Mr. C. Gratton, NRR Project Manager – Hatch  
Mr. D. S. Simpkins, Senior Resident Inspector – Hatch

IE22

NRC FORM 366 (6-2004)		U.S. NUCLEAR REGULATORY COMMISSION			APPROVED BY OMB: NO. 3150-0104		EXPIRES: 06/30/2007			
<b>LICENSEE EVENT REPORT (LER)</b>  (See reverse for required number of digits/characters for each block)					Estimated burden per response to comply with this mandatory collection request 50 hours. Reported lessons learned are incorporated into the licensing process and fed back to industry. Send comments regarding burden estimate to the Records and FOIA/Privacy Service Branch (T-5 F52), U.S. Nuclear Regulatory Commission, Washington, DC 20555-0001, or by Internet e-mail to infocollects@nrc.gov, and to the Desk Officer, Office of Information and Regulatory Affairs, NEOB-10202, (3150-0104), Office of Management and Budget, Washington, DC 20503. If a means used to impose an information collection does not display a currently valid OMB control number, the NRC may not conduct or sponsor, and a person is not required to respond to, the information collection.					
1. FACILITY NAME Edwin I. Hatch Nuclear Plant - Unit 2					2. DOCKET NUMBER 05000-366		3. PAGE 1 OF 4			
4. TITLE Manual Reactor Scram Inserted in Response to Reactor Water Chemistry Event Caused by a Condenser Tube Leak										
5. EVENT DATE			6. LER NUMBER			7. REPORT DATE			8. OTHER FACILITIES INVOLVED	
MONTH	DAY	YEAR	YEAR	SEQUENTIAL NUMBER	REVISION NUMBER	MONTH	DAY	YEAR	FACILITY NAME	DOCKET NUMBER(S)
05	23	2005	2005	003	0	07	13	2005		05000
									FACILITY NAME	DOCKET NUMBER(S)
										05000
9. OPERATING MODE										
11. THIS REPORT IS SUBMITTED PURSUANT TO THE REQUIREMENTS OF 10 CFR § : (Check all that apply)										
Mode 1			20.2201(b)		20.2203(a)(3)(i)		50.73(a)(2)(i)(C)		50.73(a)(2)(vii)	
			20.2201(d)		20.2203(a)(3)(ii)		50.73(a)(2)(ii)(A)		50.73(a)(2)(viii)(A)	
			20.2203(a)(1)		20.2203(a)(4)		50.73(a)(2)(iii)(B)		50.73(a)(2)(viii)(B)	
			20.2203(a)(2)(i)		50.36(c)(1)(i)(A)		50.73(a)(2)(iii)		50.73(a)(2)(ix)(A)	
57%			20.2203(a)(2)(ii)		50.36(c)(1)(ii)(A)		<input checked="" type="checkbox"/>		50.73(a)(2)(iv)(A)	
			20.2203(a)(2)(iii)		50.36(c)(2)				50.73(a)(2)(v)(A)	
			20.2203(a)(2)(iv)		50.46(a)(3)(ii)				50.73(a)(2)(v)(B)	
			20.2203(a)(2)(v)		50.73(a)(2)(i)(A)				50.73(a)(2)(v)(C)	
			20.2203(a)(2)(vi)		50.73(a)(2)(i)(B)				50.73(a)(2)(v)(D)	
12. LICENSEE CONTACT FOR THIS LER										
FACILITY NAME Edwin I. Hatch / Kathy A. Underwood, Performance Analysis Supervisor								TELEPHONE NUMBER (Include Area Code) (912) 537-5931		
13. COMPLETE ONE LINE FOR EACH COMPONENT FAILURE DESCRIBED IN THIS REPORT										
CAUSE	SYSTEM	COMPONENT	MANUFACTURER	REPORTABLE TO EPIX		CAUSE	SYSTEM	COMPONENT	MANUFACTURER	REPORTABLE TO EPIX
B	SQ	COND	G082	Y						
14. SUPPLEMENTAL REPORT EXPECTED								15. EXPECTED SUBMISSION DATE		
YES (If yes, complete 15. EXPECTED SUBMISSION DATE)				X NO				MONTH	DAY	YEAR
16. ABSTRACT (Limit to 1400 spaces, i.e., approximately 15 single-spaced typewritten lines)										
<p>On 5/23/2005 at 1747 EST, Unit 2 was in the Run mode at an approximate power level of 1598 CMWT (57 percent rated thermal power). At that time, Operations personnel manually scrambled the reactor per procedure 34GO-OPS-014-2, "Fast Reactor Shutdown." This procedure was entered because of a condenser tube leak that resulted in an undesirable reactor water chemistry trend. Following the manual scram, water level decreased due to void collapse from the rapid reduction in power, reaching a minimum of approximately thirteen inches below instrument zero (about 145 inches above the top of the active fuel). The decrease in water level resulted in receipt of a subsequent reactor scram, a Group 2 Primary Containment Isolation System (PCIS) isolation signal and thus closure of the Group 2 Primary Containment Isolation Valves per design. The operating Reactor Feedwater Pumps restored level to its designed set point. Personnel confirmed that all control rods fully inserted and reset the Group 2 isolation signal and restored the isolation valves to normal per procedure 34AB-C71-001-2, "Scram Procedure."</p> <p>The manual scram was initiated as the result of a condenser tube leak. An investigation determined that the condenser tube leak was caused by the loss of a plug that was installed previously in April 2005. The receipt of the Group 2 PCIS isolation and the subsequent reactor scram was the result of a vessel water level decrease due to void collapse from the rapid reduction in power following the insertion of the manual scram. The leaking condenser tube was re-plugged with a plug of a different design.</p>										

## LICENSEE EVENT REPORT (LER)

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17. NARRATIVE (If more space is required, use additional copies of NRC Form 366A)

PLANT AND SYSTEM IDENTIFICATION

General Electric - Boiling Water Reactor

Energy Industry Identification System codes appear in the text as (EIS Code XX).

DESCRIPTION OF EVENT

At approximately 1515 EST on 5/23/2005 the Unit 2 reactor water conductivity began increasing from approximately 0.1 umho/cm. The unit was operating at approximately 100 percent rated thermal power (RTP). At 1555 procedure 34AB-N61-001-2, "Condenser Tube Leaks/Chemical Intrusion" was entered. At 1605 EST the conductivity was approximately 0.98 umho/cm. At 1716 EST the operating crew entered the Fast Reactor Shutdown procedure and inserted a manual scram at 1747 EST at an approximate power level of 1598 CMWT (57 percent rated thermal power).

Following the manual scram, vessel water level decreased due to void collapse from the rapid reduction in power, reaching a minimum of approximately thirteen inches below instrument zero (about 145 inches above the top of the active fuel). The reduction in level resulted in a subsequent actuation of the Reactor Protection System (RPS, EIS Code JC) and a Primary Containment Group 2 Isolation System (PCIS, EIS Code JM) actuation. The Group 2 PCIS valves closed as designed. As a result of the preceding manual scram, the control rods (EIS Code JD) were already fully inserted, therefore, the Reactor Protection System actuation on low water level did not result in control rod movement.

The operating Reactor Feedwater Pumps (EIS Code SJ) automatically restored water level to its designed setpoint. Operations personnel confirmed that all control rods fully inserted per procedure 31GO-OPS-010-0, "Scram / Transient Analysis." Additionally, Operations personnel confirmed the Group 2 PCIS isolation valves closed as expected, reset the Group 2 isolation signal, and restored the isolation valves and the RPS system to their normal configurations per plant procedure 34AB-C71-001-2, "Scram Procedure."

Investigation of the event determined that a condenser tube (EIS Code SQ) plug installed on a previously leaking condenser tube was missing. The tube plug on the leaking condenser tube was installed in April 2005 and was a Hennigan Engineering, HEPCO, Ultem (Plastic Nut and bolt) Double tube plug. Additional inspections determined that several of these tube plugs that were previously installed in other locations were also missing. The plugs that were recovered were found to be broken.

CAUSE OF EVENT

The manual scram was inserted due to an undesirable reactor water chemistry trend that resulted from a leaking condenser tube. This condenser tube leak was the result of a previously installed condenser tube plug failing. The tube plug on the leaking condenser tube was installed in April 2005 and was a Hennigan Engineering, HEPCO, Ultem (Plastic Nut and bolt) Double tube plug. Additional inspections determined that several of these tube plugs that were previously installed in other locations were also missing. The plugs that were recovered were found to be broken.

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## 17. NARRATIVE (If more space is required, use additional copies of NRC Form 366A)

These additional failed plugs had been installed as precautionary measures in, for example, bent tubes or tubes with thinning walls that were not leaking. A failure analysis of the failed condenser tube plugs was performed. A microscopic examination of the failed bolts revealed that they failed because of significant amounts of internal center-wall voids that decreased the bolt strength. All of the broken bolts showed internal center-wall voids. Additionally, an examination of a bolt that was used but had not failed showed very few voids.

The Group 2 PCIS isolation and the subsequent RPS actuation were the result of a vessel water level decrease due to void collapse from the rapid reduction in power following the planned insertion of a manual scram. Upon insertion of the manual reactor scram at 57 percent power, water level decreased to below the Group 2 PCIS isolation setpoint resulting in receipt of a Group 2 PCIS isolation signal and closure of the Group 2 isolation valves per design.

REPORTABILITY ANALYSIS AND SAFETY ASSESSMENT

This report is required by 10 CFR 50.73 (a)(2)(iv)(A) because of the unplanned manual scram and the unplanned actuation of Engineered Safety Features following the manual scram. The reactor coolant system (RCS) chemistry values are established by the plant's Technical Requirements Manual (TRM) Section T3.4.1. During this event the RCS chemistry was maintained within the limits established by the TRM. Following the manual scram, reactor vessel water level decreased due to void collapse. Level reached a minimum of about thirteen inches below instrument zero (about 145 inches above the top of the active fuel). The decrease in water level resulted in an automatic RPS actuation (all control rods were already inserted) and a Group 2 PCIS isolation on low water level and thus closure of the Group 2 Primary Containment Isolation Valves per design. The RPS and PCIS are Engineered Safety Feature systems.

The operating Reactor Feedwater Pumps automatically restored water to its designed setpoint. Operations personnel verified correct system response and restored the isolation valves and the RPS to their normal configuration.

All systems functioned as expected and per their design given the water level transient. Water level was maintained well above the top of the active fuel throughout the transient and was restored to its desired value without the need for emergency core cooling system actuation. Therefore, it is concluded the event had no adverse impact on nuclear safety. This analysis is applicable to all power levels.

CORRECTIVE ACTIONS

The previously leaking condenser tube that was found to have a missing plug was stabilized and re-plugged using an extended tapered stainless steel tube plug. The other missing tube plugs were replaced with the original style of tube plug but utilizing a titanium nut and bolt rather than the Ultem material.

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17. NARRATIVE (If more space is required, use additional copies of NRC Form 366A)

ADDITIONAL INFORMATION

Other Systems Affected: No systems other than those already mentioned in this report were affected by this event.

## Failed Components Information:

Master Parts List: 2N61-B001B  
Manufacturer: General Electric  
Manufacturer Code: G082  
EIS System Code: SQ  
EIS Component Code: COND  
Root Cause Code: B  
Reportable to EPIX: Yes

Commitment Information: This report does not create any permanent licensing commitments.

There were no previous events in the last two years in which a condenser tube leak resulted in an unplanned manual scram. There has been one previous similar event in the past two years in which a planned manual reactor scram resulted in unplanned Engineered Safety Feature system actuations. In this event, reported in Licensee Event Report 50-366/2004-002, dated 11/23/2004, Unit 2 was scrammed manually with power level at approximately 35 percent rated thermal power. The resulting water level transient caused the Group 2 Primary Containment Isolation Valves to close on low reactor vessel water level. From this event, the Normal Plant Shutdown procedure was revised to provide guidance when the Group 2 isolation was expected.